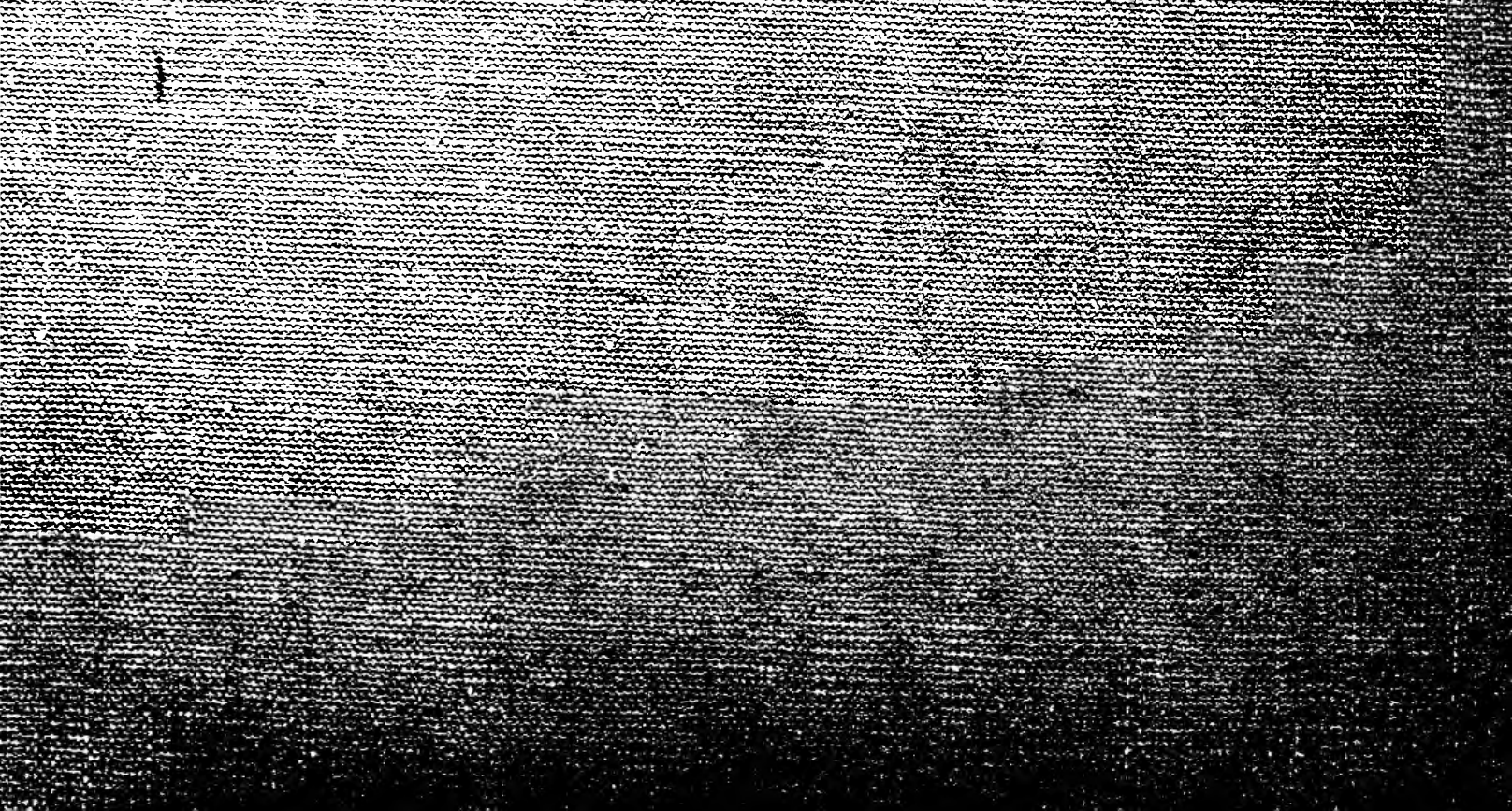

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BY THE HOUSE OF DELEGATES,
March 2, 1844.

Read and ordered to be printed.

REPORT

OF THE

COMMITTEE ON AGRICULTURE,

RELATIVE TO THE

Application of Lime to the Different Qualities of Soil,

AND THE

USE OF CALCAREOUS MATTER

FOR

AGRICULTURAL PURPOSES.

In obedience to an order of the House of the 27th January

ANNAPOLIS:
RILEY & DAVIS, PRINTERS.
1844.

REPORT.

The Committee on Agriculture, to which was referred the order submitted by Mr. Smith, on the 27th of January, beg leave to

REPORT:

That an increased production from the soil, effected by the application of lime has by no means been a discovery of modern times. As it exists in marl, it was long used by the ancient Greeks, who probably knew not that they were applying lime. The Romans were aware of the value of marl, but its existence in Italy was not known till after the fall of the Roman Empire. When they pushed their conquests into Gaul and Britain, they found the barbarian farmers, as they were considered, manuring their lands with marl, which they have continued to do to the present day. The application of calcined stone or lime to land in Europe commenced at a later period, perhaps but little before the beginning of our era. The Chinese now use it, and no doubt have been in the practice from a remote period. Since the revival of letters the attention of scientific men has been devoted to the rationale of its action upon the land. They made little progress, however, until within a few years past. The discoveries of Saussure, Davy, Chaptal, Sprengel, Boussingault and a host of other eminent enquirers into the relations of chemistry to agriculture and vegetable and animal physiology, laid before the world a mass of valuable facts, which the gigantic mind of Liebig has enabled him to generalise, and to develope light and certainty where much darkness and mystery formerly existed. The principles adopted in his investigations, brought him to conclusions which seem evidently founded upon the immutable laws of nature. We may safely assert that a new era has dawned upon agriculture and physiology.

On the continent of Europe where it is esteemed the duty of the different governments to encourage agriculture, as far as lies in their power, we find many able men under their fostering care, devoting

themselves to the important occupation of bringing science to the aid of agriculture, and a flood of light is being shed upon the subject of rendering the soil more productive. In England we find them fully alive to the subject; her nobles and gentry, who were in times past disposed to rest their claims for honorable distinction upon their success in making war upon their enemies or upon one another, are now found entering the lists to compete with each other, in the less chivalric, but certainly more useful occupation of raising turnips. The princely fortunes of many of her land holders, enable such as require it, to get efficient aid from the investigations of scientific men. The works of Professor James F. W. Johnston, who is exclusively devoted to agricultural chemistry, are republished in this country as fast as they issue from the press in England. They are of inestimable value to the farmer.

A few years since, there would have been little use in making the inquiries now proposed to the committee, for the reason that there were too few data to start with; the subject was so much veiled in mystery, that we could have said little more to the farmer than "that as experience proves, that lands cannot for a long period be profitably cultivated without the application of lime in some form or other, it is expedient to use it." Now, however, such a wide field of research is opened to us, that we find it difficult to confine ourselves to those branches of the investigation that we can complete within the time we have allotted for making this report. Whilst we regret that the lateness of the period when the subjects were committed to our charge has prevented a more full examination, and a more systematic arrangement of the matter; we hope, however, our exertions will be found to throw some light on this most interesting subject, and be of some little practical use at least, to our agricultural community—and make still more manifest the importance of further pursuing the subject of the application of science to agriculture, so that we may keep pace with the improvements of the age.

SECTION 1.—*Of the properties of lime and some of its compounds the most important to agriculture.*

Lime is not, as was formerly supposed, a simple substance; it is composed of a metallic substance called calcium united to oxygen. When pure it is a white brittle earthy solid, having alkaline properties, whose specific gravity is to that of water as $2\frac{3}{10}$ to 1. It is *per se* one of the most infusible of known bodies, having a strong affinity for water, and when combining rapidly therewith a considerable degree of heat is developed, as may be observed when it is slacking. The heat is often sufficient to ignite wood and other combustibles. The compound of lime and water, constitutes what is called *hydrate of lime*, or water slacked lime, its constitution is

Lime,	76 parts.
Water,	24 "
	100

This hydrate is sparingly soluble in water, and more so in cold than in warm water. About 700 grains of pure water, free from carbonic acid, will dissolve 1 grain of lime.

Carbonate of lime, (common limestone,) consists of

Lime, - - - -	56 parts.
Carbonic acid, - - -	44 "
	100

It constitutes the great mass of the limestone and chalk which form so large a portion of the crust of the earth. It is the principal constituent of shells, and forms the calcareous matter of marls.

Carbonate of lime is nearly if not quite insoluble in pure water, but is readily dissolved in water containing carbonic acid, and as rain and snow water always contain carbonic acid, lime upon or near the surface of the earth is unceasingly being dissolved and diminished in quantity—an exceedingly interesting fact in an agricultural point of view.

Lime in combination with phosporic acid is called *phospate of lime*, and sometimes "bone earth." It constitutes, with a smaller proportion of carbonate of lime, nearly all the earthy matter of bones. It also exists in small proportion in shells.

It is insoluble in pure water, but the presence of acids (even the weakest of all, carbonic acid,) renders it soluble. Phosphoric acid and lime unite in several proportions, but the combination that most concerns us, is that which forms part of bones and shells, which is

Phosphoric acid, - - -	52 parts.
Lime, - - - -	48 "
	100

Sulphate of lime, is well known under the names of *gypsum* or *plaister of paris*, and when pure consists of

Sulphuric acid, - -	46 parts.
Lime, - - -	33 "
Water, - - - -	21 "
	100

Having thus briefly glanced at some of the properties and combinations of lime, we proceed to treat of lime as a manure, &c.

Section 2.—*Of lime as a manure or as a constituent of plants.*

The elementary constituents of all plants, for the most part consist of carbon, hydrogen, oxygen and nitrogen. The three first exists in the largest proportion, and form the great bulk of the plant, the last is equally necessary, and with the rest, form the albumen, gluten and other nitrogenous compounds which principally abound in the seeds and juices of plants. The air of our atmosphere always contains water, carbonic acid and ammonia, which furnish to plants the above named elements nearly equal perhaps to their wants, after the first stages of their growth. In former days these were believed to be all that were essential to vegetation, but mo-

dern science has demonstrated that certain mineral substances, which the results of combustion proved always to exist in plants, were quite as essential to their growth.

We might illustrate this position by the investigation of animal and vegetable physiology, but we must avoid digressing more than is absolutely necessary to the proper understanding of the subject under consideration, and be content with the remark, that nature has decreed that plants shall receive certain matters, in a great part from the atmosphere, and those we call their organic part—but their mineral constituents *must* come from the soil. The most important of these mineral substances are potash, soda, lime, silica magnesia, iron, manganese, phosphorus, sulphur, chlorine and iodine. There are others found in smaller proportion in plants, but most of these are perhaps non-essentials.

The mineral matters constitute, generally, from one to two per cent. of the living plant, and are what we call ashes, when the combustible parts have been burned away. Their state of combination is varied by every different plant.

The phosphorus is, perhaps, always united to oxygen, forming phosphoric acid, which in plants usually exists in combination with lime or magnesia, or with both, as in the grain of wheat, and in many other seeds. The sulphur, in most instances, exists as sulphuric acid, which is generally united with lime in plants, but often is combined with potash, soda, &c.; the chlorine is a combination with the potash, or forms with the soda the well known common salt. Iodine only exists in plants growing in or near the salt waters. Besides these mineral acids, various other acids, the products of vegetable organism, form in plants, compounds with the above named alkalies, earths and metallic oxides.

Before this subject was sufficiently investigated, it was common to consider only such substances as furnished *vegetable* food to plants "*manures*," whilst mineral or inorganic matters such as lime potash, &c., it was supposed entered the plants to act as stimulants or to have some undefinable mechanical action. Some are sufficiently fanciful yet to cling to the stimulating theory, but the exact and rigid rules for scientific investigation of the present age permits not the indulgence of fancy, which has been transferred from the more exact sciences to poetry. Each plant always contains certain mineral or organic compounds, (subject to little variation, as will be seen) in whatever part of the world the plant may have its existence. If these essentials be deficient, the plant will languish and produce a stunted growth: if entirely absent from the soil the plant will die soon after, exhausting the minute quantity which the seed contained. In order to show what is necessary to some of our most important plants, we will state the quantities and kinds that exist in Tobacco, Wheat and Clover.

1,000 *lbs. of dried Tobacco leaves contain:*

Chloride of potassium,	.63 lbs.
Sulphate of "	.50 "
Potassa combined with nitric and malic acids,	.91 "
Phosphate of lime,	1.66 "
Lime combined with malic acid,	2.44 "
Silica (same as flint or quarts,)	.88 "
Being nearly seven pounds.	6.92

1,000 *lbs. of Wheat and the* 2,000 *lbs. of Straw that has borne it contains:*

	Grain.	Straw.	Total.
Silica, (sand)	4.00	57.40	61.40
Potash,	2.25	.40	2.65
Soda,	2.40	.60	3.00
Magnesia,	.90	.64	1.54
Alumina, (clay)	.26	1.80	2.06
Sulphuric acid, (oil vitriol)	.50	.74	1.24
Phosphoric acid,	.40	3.40	3.80
Chlorine,	.10	.60	.70
Lime,	.96	4.80	5.76
The total being 83 $\frac{15}{100}$ pounds.	11.77	70.38	83.15

1,000 *lbs. Red Clover when made into Hay contains:*

Lime,	27.80 lbs.
Pot-ash,	19.95 "
Soda,	5.29 "
Magnesia,	3.33 "
Silica, (sand)	3.61 "
Sulphuric acid,	4.47 "
Phosphoric acid,	6.57 "
Chlorine,	3.62 "
	74.64 "

Besides traces of Alumina and Iron.*

*NOTE.—These results shew that clover contains in equal weights nearly three times the amount of inorganic matters contained in the whole wheat plant deducting the roots. If we deduct the silica which abounds in all soils we find that clover contains nearly *ten times* the quantity of minerals, as wheat. One great effect of clover is the pumping up, as it were, by means of its long and descending roots these necessary materials from depths to which Tobacco, grains, grasses, &c., do not reach. The crop being allowed to rot on the ground or fed to stock whose manure is put on the fields, give a large quantity of mineral matters which we believe are more effective to the succeeding crop than the vegetable part.

It has been ascertained that 1,000 lbs. of maize or Indian corn contain 15 lbs. of the Phosphate and Sulphate of lime, but a complete analysis of the whole plant has not yet been made as far as has come to our knowledge. Every soil depends for its fertility mainly upon its containing due proportions of certain mineral matters. We find however, that nature's laws admit plants (in cases where one or more of these are deficient,) to substitute certain others, but this is confined within well defined limits. For instance, one alkali or alkaline earth may supply in part the place of another, and some acids may be partly supplied by others, but here those partial substitutions stop. As an instance for illustration, we may give the fact, that where soda and pot-ash are deficient in a soil, their place is partly supplied by lime, but if all three be absent, the soil will be absolutely sterile however well, we might manage it in all other respects, except in supplying the deficiency. Hence we would remark, that to determine whether lime "acts as a manure," we must know in what sense the term is used. If we mean by manure, such substances as upon being added to a soil, increase the growth of plants therein, it follows that lime as well as many other matters essential to vegetation, act as manures only in such soils as do not contain them in due proportion. We shall conclude this branch of our investigation with the following maxims, viz:

1. Lime is an essential constituent of plants.

2. That plants will not thrive when it is entirely absent from the soil.

3. Chemical analysis has demonstrated that lime exists in all fertile soils, that have hitherto been accurately analysed.

4. In such soils as are absolutely sterile, it has been proven when they have been analysed that some of the essential inorganic substances are absent; and that it is lime very frequently.

Having hitherto treated of lime only as a mineral constituent of plants, we proceed to shew that lime and the alkalies serve other important purposes of vegetation.

SECTION 3.—*Of the effects of lime upon the substances composing the soil.*

Lime and the alkalies act energetically upon organic textures living or dead; the action of the alkalies pot-ash and soda, is but slightly lessened even when they are in combination with carbonic acid. The action of carbonate of lime however, is far more feeble than quick lime. In hastening vegetable decomposition the alkalies and lime also, accelerate the liberation of the inorganic matters contained therein, and at the same time, produce a more ready supply of humus, useful to the plant in all stages of its growth, but more particularly so, when young, and before it has many leaves to get sufficient supplies of carbonic acid, ammonia and water from the atmosphere. Lime and the alkalies decompose many stoney bodies and liberate matters useful to vegetation.

Most of the rocks of Maryland contain lime, pot-ash and soda

and sometimes all three exist in the same rock. Soils which have not been produced by matter deposited by water (called transported soils,) are the result of the slow disintegration of rocks, and when sufficient of such finely disintegrated matter accumulates upon the rock, plants begin to grow in the soil so formed. The soils of our territory above tidewater have been thus formed, whilst the soil of the lower country has been for the most part transported by water. We should expect therefore, such matters as existed in the rocks would be in the soil and such is the fact, although portions of some of the constituents are carried off in solution. An important use then of lime, is further to promote the decomposition of the mineral constituents of the soil, in order to eliminate, such as plants require. We cannot conceive an arable soil to exist, in which lime will not, in this manner, do good service. The mechanical texture of soils is improved by the use of lime. All farmers know how necessary it is that a soil should neither be so stiff as to prevent sufficient access of air and water, nor so light as too readily to permit water to escape by percolation or evaporation. When a soil is loose or friable it is owing to the presence of sand and other small grains of rocks not sufficiently disintegrated. Lime continues the process of decomposition or disintegration and of course produces a finer texture to the soil, at the same time that it liberates a further supply of the alkalies and other useful matters they may contain. So much then for the action of lime upon the mineral constituents of the soil. We incline to the belief, that a more important use to us is in its action upon the decaying vegetable and animal matter in the soil. It has long been known that the beneficial effects of lime are more striking when applied to soils which abound in organic matter, such for instance as grass or clover fields. This is due to its hastening the decay of the vegetable matter.

We should bear in mind that this occasions a more rapid exhaustion of these matters in the soil, in the regular course of cropping, unless supplied by manures containing the same elementary principles which have been abstracted.

Section 4.—*Of the effect of lime upon the quality of crops and upon matters injurious to them.*

The settled judgement of observant farmers, both, in Europe and our own country, seems to be, that its application promotes the growth and improves the quality of all our grains and grasses in all soils deficient in calcareous matter, and by its neutralizing effect upon our soils, frees us from many noxious weeds and insects. Would not those who seek to have the standard weight of wheat reduced, find it to their interest to increase both its aggregate and specific weight by the application of lime and marl to their lands, instead of looking to a reduction of the standard below 60 pounds to the bushel? Let us not fall back in this enterprizing age.

It seems to be universally admitted in England that lime tends to prevent smut in wheat when applied to the grain before seed-

ing. Being soaked a few hours in a strong brine of salt and water, it is then mixed with fresh slaked lime in fine powder and sown. Lime as well as the alkalies quickens the germination of all seeds, and so hastens the coming up of all seeded and planted crops. Acid substances injurious to growing plants are neutralized by lime.

These acids often exist, more particularly in newly drained marshy or boggy land. Sulphate of iron or copperas (very injurious to living plants,) is common in the same kind of soil, and when a sufficient quantity of lime is applied and thoroughly mixed with the soil the *hurtful* compound is decomposed, and an oxide of iron and *sulphate of lime* or gypsum is formed, both of which are essential to plants.

Having thus indicated some of the most important effects produced by lime in its relations to agriculture—we proceed to consider some of the modes of applying it to the soil.

Section 5.—*Of the best modes of applying lime.*

Unfortunately the great body of the agriculturists of our country and indeed of the world, have hitherto been too little disposed to make themselves acquainted with the fixed principles of the sciences appertaining to their profession. Without some such knowledge we are often liable to entertain wrong views and be mistaken in matters of fact coming under our notice. How often do we find persons firmly adhering to *false facts*, which a knowledge of the principles involved would have guarded them from? Upon this subject we submit the following observations.

In the first place, we think it must be obvious to every one who will look into the subject, that to attain the *greatest* effect from lime it must be applied in a perfectly fine powder or in solution, and be intimately mixed with the soil to a proper depth.

But bearing in mind its solubility, we are warned by economy not to apply it much below the surface, because it never ascends unless brought up by the plough, but on the contrary is incessantly descending deeper into the soil. The more porous the soil the more rapidly it will descend, and of course, should not be placed so deep in a friable soil, as it may be in a stiffer one.

Besides being carried down by solution, it is found to descend in powder by being washed mechanically through the interstices of a friable or recently cultivated soil. It seems clear therefore, that lime should either be laid on the surface, as a top dressing, or only mixed with the surface soil, by the harrow or cultivator.

In eastern Pennsylvania where the farmers have long had experience in the use of lime, it has been the practice of late years, to spread it carefully upon their grass lands at least two years before plowing them. The excellence of this system is sustained both by theory and practice—because much of the lime will be found to have sunk some inches into the soil, but not below the reach of the plough, which turns it up and by subsequent cultivation it becomes well mixed through the soil.

Quick lime and manure should not be mixed together or applied

about the same time to the soil—the intervention of a year would be better perhaps, for the reason, that it very rapidly decomposes the manure and liberates faster than is necessary the valuable gaseous matters, which should remain in the soil as far as possible until the plants absorb them. In hot weather this effect would be more pernicious than when the ground is cold. These objections to mixing lime with manure do not apply to marl, which acts very slowly upon manure. Lime is useful in composts which contain little or no stable manure, in fact both experience and theory coincide in favor of the opinion, that the most economical mode of using lime is by mixing with at least five or six times its weight of earth, (which is the better, if rich in vegetable matter,) the mixture should lay several months before using. Lime applied in this way acts more promptly upon the growing crop than when applied alone, and the bulk of matter being greater it may be more uniformily spread over the ground.

Almost every farmer can find materials for such composts in swamps or ditches. As the decay of organic matter depends upon the presence of the oxygen of the atmosphere, of course lime aids it most when near the surface, and when buried deep in the soil is almost if not quite useless for this purpose.

Section 6.—*Of the quantity to be applied.*

In the present state of knowledge, expereince should guide us in regard to the proper quantity to be applied to the acre, inasmuch as a great diversity of opinion exists among those who use lime. And this diversity of opinion, we are strongly inclined to believe, will continue to exist until analysis is resorted to as our guide—both as to the *properties of the soil* and the *quality of the lime*. In England, it is common to use from 160 to 320 bushels per acre. The heat of our summers in rapidly effecting the decomposition of vegetable matters, does much here, that in England requires the aid of lime—and the alternate freezing and thawing of our soil in winter, renders less lime necessary to promote the disintegration of the mineral substances.

It was formerly more common to apply lime in larger doses and at longer intervals than seems to be prefered now. The more carefully the lime is applied, the less is required, and from all the information we at present have upon the subject, we incline to the belief that a quantity equal to about 40 to 50 bushels of *good quick lime*, should be applied to an acre, of most of our soils, and repeated every 8 or 10 years; or what would be better, perhaps, half that quantity in compost applied at shorter intervals. The reason why lime must be repeatedly added to soils, we hope we have rendered sufficiently obvious to all in the facts already stated, (because we regard it as a highly important matter,) that the quantity is incessantly being reduced by what is carried off in the rain water, water percolating through the soil, absorbed by plants and carried off in the crops, &c. We think then that experience confirmed by theory points to the propriety of applying small doses, at short in-

tervals. By adopting this mode, the lime is kept nearer the surface and more uniformly distributed to every part of the soil, so that every fibre of the roots of the growing plants can have its due supply, and all the matters of the soil are more likely to be continually acted on.

The shell marls so bountifully dispensed over a considerable portion of our State below tide water, have an important bearing upon the agricultural prosperity of our tide water districts.

They consist of marine shells mixed with sand or clay, and their value is in proportion to the amount of shells they contain susceptible of being readily disintegrated. When they consist principally of hard shells it might be advisable to calcine them if good marl cannot be had. The marl should lay on the surface one or two years, (according to the condition of the shells,) before being ploughed in, in order that the shells may be crumbled to powder, or as nearly so as possible. The composition of our marls vary so much, that no rule can be laid down as to the quantity proper to be applied; all we can do is to refer those interested to the reports of Professor Ducatel, the late State Geologist, in which they will find much valuable information.

It has generally been supposed by those cultivating limestone lands, that the calcareous principle was not wanting in them. Believing that this opinion is founded in error to a great extent, if not entirely, it may not be deemed entirely out of place in concluding this subject, to recommend the use of lime upon them, unless chemical analysis should shew a sufficiency of it in the soil.

SECTION 7.—*Of the value of lime compared with common manure.*

Chemical analysis shows that common barn yard manure contains all the ingredients that enter into the composition of plants, and if the dung of all the domestic animals on a farm be mixed together, the mineral constituents will be found about in the proportion required by our cultivated crops. This is the reason why it is applicable to all soils, and in every climate.

The committee know of no means whereby the comparative value of lime and common manure could be ascertained. The action of common manure lasting only some two or three years, whilst that of lime is prolonged to 20 or 30 or more years.

SECTION 8.—*Of sulphate of lime, or gypsum.*

Although not directed by the order of the House, to make an enquiry into the uses or effects of lime in this form, we take leave to submit that Professor Liebig says, that the action of gypsum "depends only upon its fixing in the soil the ammonia of the atmosphere, which would otherwise be volatised, with the water which evaporates. The carbonate of ammonia contained in rain water is decomposed by gypsum, in precisely the same matter as in the manufacture of sal-ammoniac. Soluble sulphate of ammonia and carbonate of lime are formed; and this salt of ammonia possessing no volatility is consequently retained in the soil. All the gypsum gradually disappears, but its action upon the carbonate of ammonia continues as long as it exists." This as we believe well

established fact most strongly urges the necessity of its application to all soils in which it is deficient, and also to the utility of applying it liberally to composts and manure heaps, it also materially lessens the odors from stables, privies, &c. whereby the health of man is promoted, as well as the domestic animals. Gypsum, like lime however, frequently contains a large proportion of matters foreign to it—most generally carbonate of lime, and the materials of which clay consists.

In this view of the matter, we take it for granted, that its use will be greatly extended, and how far the farmers interest is protected under our present system of inspection, in relation to the purity of this article, we know not. The subject, we think, merits public attention.

Concluding remarks.

A few years since, the use of lime for agricultural purposes in the State, was almost wholly confined to a few persons in the vicinity of what is called the Gunpowder limestone districts, in Baltimore County, and fewer still in Carroll and Frederick Counties, on the Western Shore, and in Talbot, Kent and Queen Anne Counties, on the Eastern Shore. At this time, however, its use is rapidly spreading all over the State. The valuable beds of marl in the lower counties so long neglected, are being, we believe, more extensively used, although much less so than their intrinsic value merits. Their use should not be confined to the farms on which they occur, but all along the navigable shores of the Chesapeake Bay and its tributaries, at least, if not along the lines of all our public improvements. Their existence, in many places, within a few yards of where vessels can ride, greatly favors their use.

Pure lime, however, can be more advantageously hauled by the farmer to greater distances, and consequently immense quantities of lime will be wanting in our tide water counties through all coming time. The cause of the great extension of the use of lime is attributable partly to the diffusion of more correct views in regard to its uses in agricultural operations, and the sanctions of experience greatly aided by a large reduction in price.

Formerly our tide water counties procured their stone lime from two sources, principally, viz: the Gunpowder district in Baltimore county, and Thomastown, in Maine, that from the former costing upon our bay and river shores, say from 30 to 40 cents per bushel, and that from the latter usually at a higher price. In the progress of time, however, avenues of cheap transportation have opened into the interior, bringing both the stone and the fuel for burning them to tide water, at greatly reduced rates. It is now pouring into the Chesapeake Bay through the Chesapeake and Delaware Canal, the Tide Water Canal, the Baltimore and Susquehanna Railroad, and from the valley of Herring Run, near the city of Baltimore. Limestone also occurs along the line of the Baltimore and Ohio Railroad, between Baltimore and the Potomac, and is being distributed along the line of that road, as also along the Philadelphia,

Wilmington and Baltimore, Baltimore and Washington, and Elk-Ridge Railroads. And last, though not least, inexhaustible supplies of good limestone occur at many places upon the Chesapeake and Ohio Canal, which can be advantageously brought to tide water. And when that great work reaches the coal region of Allegany county, the fine coal can be delivered at the limestone quarries on the lower parts of the canal, and at tide water, at exceedingly low rates, and thence can be cheaply distributed among all the counties bordering on the Chesapeake Bay and its tributaries. A considerable lime trade has already sprung up along the canal. The new impulse, thus given, to our agriculture by our public works, will always continue to the mutual advantage of both. Although the embarrassed condition of our finances, growing out of their construction, rests heavily upon us, and is the present cause of much prejudice against them; we think the time is not remote, however, when they will be differently regarded. By the census of 1840 it is shown, that the annual product of the agricultural industry of Maryland, alone amounts to seventeen million dollars; nearly two-thirds of the annual product of the entire industry of the State. The tide of emigration has ceased. Mercantile operations have been curtailed, and capital is seeking permanent investment in the soil. The spirit of improvement manifested throughout the State, with such great facilities to sustain it, and a sure reward awaiting it, authorises the assumption, we think, that the annual product of our industry will be greatly increased—the faith and honor of our State maintained, and the substantial comfort and happiness of our people established.

The Committee respectfully recommend to their agricultural brethren of the State of Maryland, to procure the analysis of such soils, as they may take means to improve by lime, or otherwise; and transmit the same to the Chairman of the Committee on Agriculture, at the next session of the Legislature, together with a portion of the soil, and its average product per acre, prior to improvement—and to several succeeding legislatures its average product under such improvement—to the end that a basis may be formed upon which an intelligent and profitable system of husbandry may be established.

All of which is respectfully submitted.

D. W. NAILL,
PHILIP POULTNEY,
ROBT. GHISELIN,
LYDE GRIFFITH,
WARFORD MANN.

A TABLE,

Shewing the Annual Products of Industry in Maryland.

I. *Agriculture,*				
Horses and Mules,	No.	92.220	$4,611,000	
Neat Cattle, . .	"	225.714	2,708,568	
Sheep, . . .	"	257.921	381,881	
Hogs, . . .	"	416 943	1,250,829	
25 per cent of .		—	8,952,278	
is		—	2,238,069	
Poultry, . . .		—	218,765	
				$2,456,834
Wheat, . .	Bushels	3.345.783	$3,345,783	
Oats, . . .	"	3.534.211	1,413,684	
Indian Corn, .	"	8.233.086	4,058,271	
Other Grain, .	"	800.777	610,582	
Potatoes, . .	"	1.036.433	259,108	
				10,559,008
Wool, . .	lbs.	488.201	170,870	
Products of Dairy, .		—	457,466	
" Orchards,		—	105,740	
Tobacco, .	lbs.	24.846.012	1,739.220	
Hay, . . .	tons.	106.687	1,066,870	
Other Products, .		—	1,020,712	
				4,560,878
Amount of Agricultural Products, . . .		—	—	17,586,720
II. *Commerce,* 25 per cent on Capital, . .		—	—	3,499,087
III. *Manufactues,*				
Metals and Machinery, .		$690,155		
Woollen, . . .		235,900		
Cotton, &c., . .		1.692,040		
Hats and Caps, .		153,456		
Leather, . . .		150,275		
Paper, . . .		198,100		
Carriages, . . .		357,622		
Furniture, . .		305,360		
Ships, ...		279,271		
Houses, . . .		1.078,770		
Other Manufactures .		2.779,855		
			$7,921,334	
Deduct for materials one third, . . .		—	2,640,444	
Carried forward.				

TABLE—Continued.

Manufactures by Mills, one quarter, . .	—	$816,812	
Printing, &c. . .	—	114,975	
			$6,212,677
IV. *Mines*, . . .	—	—	1,056,210
V. *The Forest*, .	—	—	241,194
VI. *Fisheries*, . . .	—	—	225,273
Total, . .	—	—	$28,821,661